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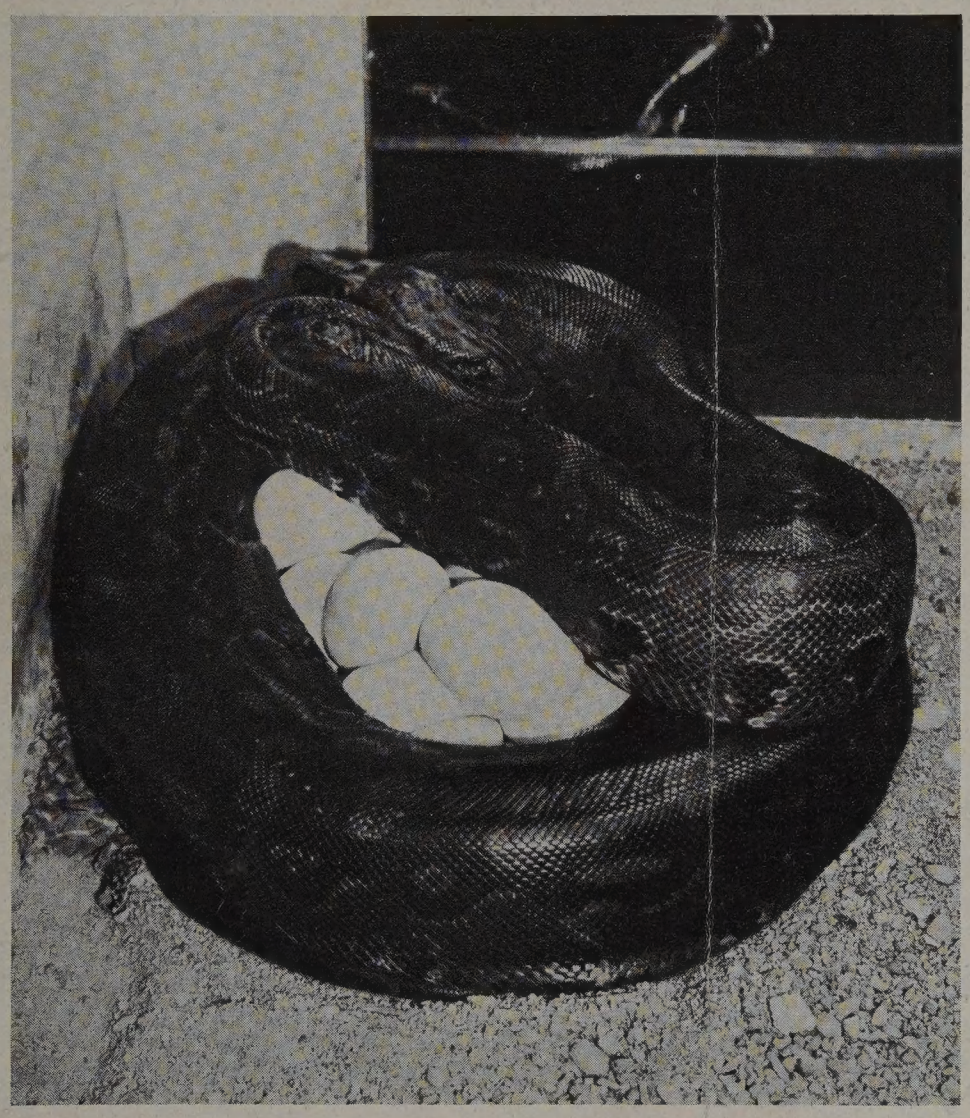
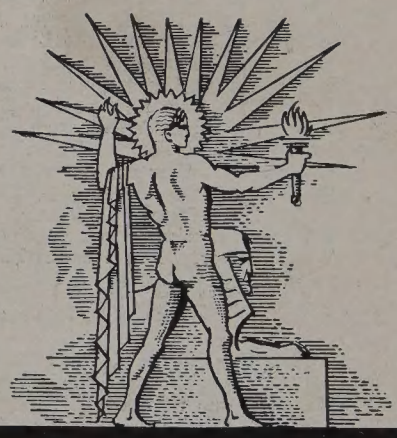
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





MAY 9, 1931

Madame Python Accepts Family Cares

See Page 292

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The Weekly Summary of Current Science

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DO YOU KNOW THAT

British botanists are puzzled to find that the musk plant grown in gardens no longer has its characteristic perfume.

With the increase in good roads and the higher speeds allowed, wind resistance is assuming greater importance in passenger car design.

The life of a skyscraper is apt to be about 30 years, not because the building is worn out by that time, but because it makes way for a newer structure.

A new anti-aircraft gun, built in England, is capable of striking airplanes more than five miles above the earth.

An armored railway car equipped with cells like prison cells is in use in Germany for transporting prisoners from one institution to another.

The smallest fly that bites human beings is the punkie, which can literally pass through the eye of an ordinary needle.

Government plant specialists say that corn earworms cost the farmers $40,000,000 a year, and that this could be cut in half if farmers would plant their corn early and select a variety well suited to local conditions and with a long, tight husk.

Indian men and women made perfume from wild bergamot and other fragrant plants, using it to scent their clothing.

Grapevines that are too thickly laden with leaves produce less desirable fruit than vines with fewer leaves, it has been discovered.

WITH THE SCIENCES THIS WEEK

AERONAUTICS
Improved Wind Tunnel for Canada 297
AGRICULTURE
Cattle Disease Gains in U. S. 302
ARCHAEOLOGY
Excavate Indian Cemetery 296
Home of America's Vestal Virgins 298
New Kind of Old Art 296
ASTROPHYSICS
Equinoxial Magnetic Storms 295
Magnets Quiver Day Late 291
Sunlight Pressure Splits Comet 292
AVIATION
Birds Excel Machine Flyers 301
BIOLOGY
Bacteria Like Mixed Diet 303
Lifeless Drops Act as Though Alive 293
CHEMISTRY
Gas Made Non-Poisonous 294
GENERAL SCIENCE
Dr. Campbell Chosen President 291
First Glances at New Books 304
HORTICULTURE
Orchid Greenhouse Rotates 295
MEDICINE
Blood Shows Cancer Condition 294
Inner Ear Photographed 292
Toxin May Yield Serum 303
NUTRITION
Exercises Make Poor Reducer 297
OPTICS
Glasses Beautify Eyes 296
ORNITHOLOGY
Birds Excel Machine Flyers 301
Sea Eagle Eats Mice 297
PHOTOGRAPHY
Inner Ear Photographed 292
PHYSICS
Focus Stream of Electrons 296
Gets Million Volt Speed 296
Lifeless Drops Act as Though Alive 293
Light Speed Tube Measured 297
Measure Five Hundredth of Atom 294
PHYSIOLOGY
Brain Used For Normal Sleep 300
Manganese's Influence on Parenthood 291
PSYCHIATRY
Self Respect Sought for Patients 300
PSYCHOLOGY
Physical Differences Reveal Emotions 295
PUBLIC HEALTH
Urge Control of Methanol 302
SEISMOLOGY
High Earthquake Record 297
ZOOLOGY
Curosity of a Raccoon 291
Python Lays Clutch of Eggs 292

Science Service presents over the radio, an address

MAN'S CONTROL OF HIS OWN DEVELOPMENT

By Dr. Oscar Riddle, of the Department of Genetics of the Carnegie Institution of Washington located at Cold Spring Harbor, N. Y., who is an authority on internal secretions and sex.

Friday, May 15 at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSIOLOGY

Parenthood Seems to Depend On Inorganic Manganese

Male Rats Bereft of Manganese Become Sterile While Females Have Litters But do Not Show Maternal Solicitude

STUDIES indicating that the formation of a hormone by the pituitary gland is in some way related to the manganese of our daily diet were described by Dr. E. V. McCollum of the Johns Hopkins School of Hygiene and Public Health at the meeting of the National Academy of Sciences in Washington last week.

Dr. McCollum pointed out the relation of iodine to the thyroid gland, of calcium to the parathyroid glands, and said that apparently another glandular system had been linked with an inorganic element which is essential to the diet.

Rats which are deprived of manganese exhibit strange behavior and bodily changes, Dr. McCollum and his associate, Dr. Elsa Orent, found. The sex glands of the male rats degenerate until complete sterility results. The females, however, continue to have litters of living young but do not show any sign of ordinary maternal solicitude.

"The mothers do not build a nest or collect their young or hover over them, and the stomachs of day-old young never contain any milk, and the young die from neglect," Dr. McCollum reported. "These mothers not only decline to nurse their own young but will not care for foster young from the stock colony."

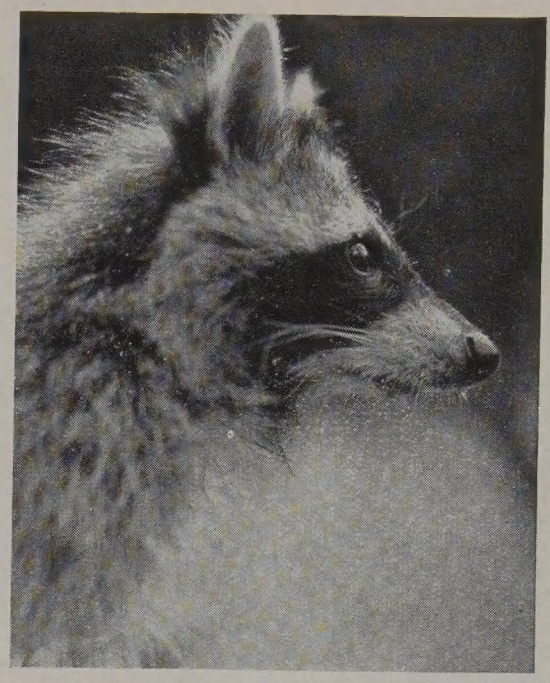
"The normal mothers also seemed to detect something wrong with the young of manganese-free mothers and abandoned them, although normal rats will ordinarily care for each other's young when the litters are exchanged.

"The addition to the manganese-free diet of as little as five thousandths of one per cent. of manganese results in correcting the behavior of the female rats toward their young," Dr. McCollum said.

Other workers have reported that male sterility in middle life is related to deficiency of the pituitary hormone, and that the pituitary gland stimulates milk secretion. Dr. McCollum suggested that since manganese deprivation had the same effect, the dietary manganese may be related in some way to hormone formation by the pituitary gland.

However, there is no need to worry over possible lack of manganese, as you worry over lack of vitamins, it appears; for Dr. McCollum reported that at the beginning of the experiments great difficulty was encountered in removing manganese comp'etely from the diet.

Science News Letter, May 9, 1931



INSATIABLE CURIOSITY

An outstanding characteristic of the original wearers of all 'coonskin coats, but not always found—so the humorists tell us—in those who fall heir to them. This raccoon in the Bear Mountain State Park, N. Y., was photographed by M. Peter Keane of the American Museum of Natural History

ASTROPHYSICS

Earth's Magnets Quiver Day After Outburst on Sun

IF ASTRONOMERS peering through their telescopes see bright clouds of hydrogen on the surface of the sun today, they can tell you that tomorrow the sensitive magnetic needles of their observatories will quiver and move from the true position.

This prediction, now possible as the result of a discovery by Dr. G. E. Hale of the Mount Wilson Observatory, Pasadena, Calif., was announced to the meeting of the American Geophysical Union in Washington last week, by Dr. Seth B. Nicholson, of the same observatory.

Dr. Hale has found that exceptional magnetic storms on the earth occur a little over one day later than the flaring of the hydrogen. He has collected accounts of several extraordinary outbursts of this nature which were followed by exceptional magnetic disturbances on the earth.

Science News Letter, May 9, 1931

GENERAL SCIENCE

California Astronomer Chosen National Academy President

DR. WILLIAM WALLACE CAMPBELL, director of the Lick Observatory and former president of the University of California, was elected president of the National Academy of Sciences at its closing session in Washington. He succeeds another noted California scientist, Dr. Thomas Hunt Morgan of the California Institute of Technology, Pasadena.

Dr. Campbell established his place in American science principally through his work in astronomy, particularly in the study of various types of heavenly bodies with the light-analyzing instrument, the spectroscope. He has also done notable work in solar eclipse problems.

Born in Ohio in 1862, he has been a Californian since 1891, when he went to Mt. Hamilton as a Lick Observatory astronomer. In 1901 he was made director of the observatory, and in 1923 president of the University of California. He retired from the latter post recently, to return to active astronomical work.

For vice-president the Academy elected Dr. David White of the U. S. Geological Survey, former home sec-

retary. Dr. Fred E. Wright of the Carnegie Institution, of Washington, former vice-president, became home secretary. Dr. W. B. Cannon of Harvard Medical School was re-elected to the Council of the Academy, and Dr. Roger Adams of the University of Illinois was chosen as his associate on the Council.

One Foreign Associate was elected by the Academy: Dr. Peter Debye, experimental physicist of the University of Leipzig, Germany.

New members were elected as follows: Henry Bryant Bigelow, Museum of Comparative Zoology, Cambridge, Mass., oceanography; Edwin Broun Fred, University of Wisconsin, Madison, Wis., bacteriology; Edwin Crawford Kemble, Harvard University, Cambridge, Mass., physics; Adolph Knopf, Yale University, New Haven, Conn., geology; Robert Harry Lowie, University of California, Berkeley, Calif., anthropology; Joseph Haines Moore, Lick Observatory, Mt. Hamilton, Calif., astronomy; Robert Lee Moore, Austin, Texas, mathematics; Hermann Joseph Muller, University of Texas, Austin, Texas, genetics; George Linius Streeter, Department of Embryology, Carnegie Institution, Baltimore, Md., embryology; Margaret Floy Washburn, Vassar College, Poughkeepsie, N. Y., psychology.

Science News Letter, May 9, 1931

ZOOLOGY

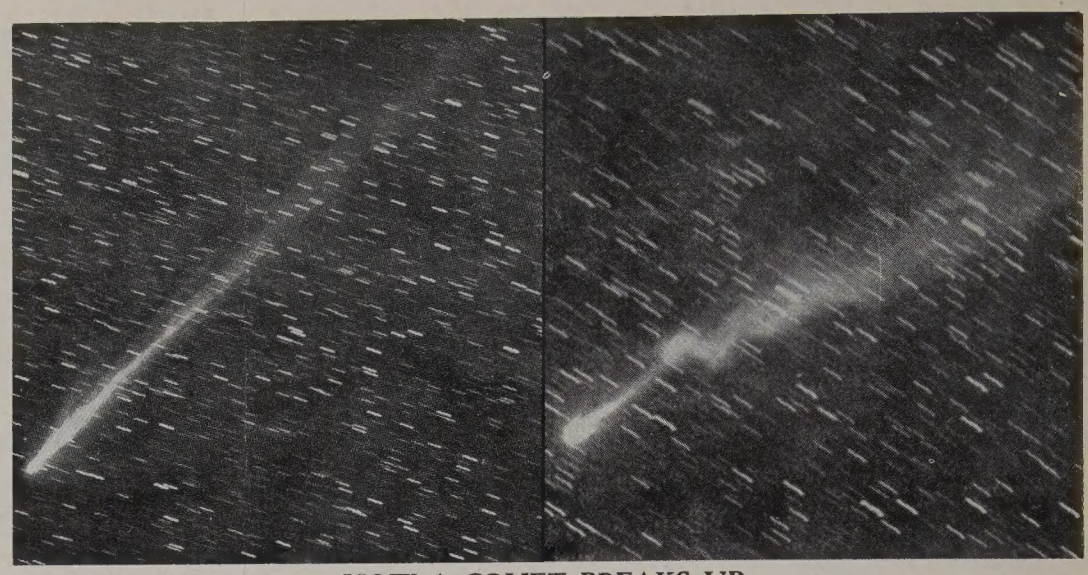
Python Likes New Home; Lays Clutch of Eggs

ONE OF the big pythons in the U. S. Zoological Park recently celebrated her transfer to the more comfortable and homelike quarters of the new reptile house there by laying a clutch of twenty eggs.

The picture on the cover of this issue of the SCIENCE NEWS LETTER shows her exercising the serpentine version of maternal care: most of the time, as a matter of fact, the eggs are kept quite invisible beneath her coils. The eggs, like many reptile eggs, have tough, parchment-like shells rather than the hard limy coverings characteristic of bird eggs.

Science News Letter, May 9, 1931

The cost of accidents in the United States is in the end paid by the ultimate consumer, and amounts to $20 a year for each person in the country, declares the president of the National Safety Council.



HOW A COMET BREAKS UP

The comet 1908c on successive days, October 14 and 15, showed this mysterious and rapid change in its appearance through the ten-inch telescope of the Yerkes Observatory. Now for the first time an explanation has been given. In agreement with Maris' new theory, a great magnetic storm occurred on the earth at the same time.. Surges of ultraviolet light from the sun are believed to cause both effects.

ASTROPHYSICS

Pressure of Sunlight Strong Enough to Break Comet in Two

GREAT outbursts of ultraviolet light from the sun may press so hard on the tail of a comet as to break it in two. This is the theory presented in Washington before the American Geophysical Union by Dr. H. B. Maris of the U. S. Naval Research Laboratory.

The curious fact that sunlight can cause such huge pressures as this is at the basis of Dr. Maris' new theory of the irregular variations of brightness observed in comets. During periods when many sunspots are visible, the ultraviolet light streaming out from the sun may increase as much as a thousand times.

The atmosphere of a comet is transparent to visible light but strongly absorbs ultraviolet light which, because of this absorption, exerts a pressure on it. The effect on the comet is to create a strong wind in its atmosphere moving away from the sun. Thus that part of a comet that feels the pressure most may get a violent jolt when a new whirlpool appears in the sun.

Magnetic storms, those great fluctuations of the earth's magnetic forces, often accompany or anticipate the unusual changes in comet activity. Since the magnetic effects are known to be due to the ultraviolet surges associated with bright spots on the sun, this forms additional support for the new theory of comet behavior.

Comet activity shows itself by changes in the brightness of the atmosphere of the comet, similar to those observed on the earth during a display of the aurora or northern lights. The aurora is caused by increased ultraviolet light from the sun, said Dr. Maris. It occurs at the same times as the magnetic storms.

Dr. Maris studied records of the great comets of last century. He found that the splitting of a comet was accompanied or preceded in nearly every case by a great magnetic disturbance on the earth.

The great comet of 1882 met a tremendous solar disturbance at the time of its approach to the sun. Dr. Maris believes that this was the cause of its subsequent disruption.

Science News Letter, May 9, 1931

PHOTOGRAPHY-MEDICINE

New Camera Photographs Disease in Ear

THE INTERIOR of the human ear can now be photographed with a new camera developed by Dr. Richard Millar, director of the photography division of the Methodist Hospital of Indianapolis.

The ear camera is hailed by the medical world as a distinct step forward in the treatment of ear diseases. For the

first time in medical history a pictorial record of different stages of ear diseases can now be kept.

The camera takes pictures 120 times as large as the inner ear. With the use of a special concave mirror, a powerful beam of cold light is focused ingeniously into the patient's ear. The exposure is made through a hole in the center of the reflecting mirror which is turned to deflect the light from the lens of the camera.

Heat is extracted from the light beam by passing it through a flat glass flask filled with ice water before it reaches the ear.

A clever ground glass arrangement fitted into the side of the camera enables the surgeon taking photographs of the inside of an ear to see the image which is passing through the camera lens even when he is operating the shutter. Thus he can see exactly the image that falls on the plate or film.

Dr. Millar is now at work on a camera which will take the picture of the back of the eye. He predicted that soon a camera will be developed that will photograph the interior of the human head from the inside.

Science News Letter, May 9, 1931

Montana has one county seat, Jordan, which is more than 90 miles from a railway.

To collect specimens of the rare goat-antelope called the takin is one special aim of the Marshall Field Zoological Expedition now in Southern China.

PHYSICS-BIOLOGY

Lifeless Drops Can Act as if They Had Life in Them

Mathematical Possibility of Mineral Drops Growing and Dividing May Explain So-Called "Artificial Cells"

DROPS of lifeless solution, suspended in another solution equally lifeless, can act as though they had life in them. They will increase in size, then divide, and the "offspring" drops in their turn grow and divide again.

The possibility of this and other lifelike behavior was demonstrated on mathematical grounds by Dr. N. V. Rashevsky of the Westinghouse Research Laboratory, East Pittsburgh, Pa., before the American Physical Society. Dr. Rashevsky has not carried out experiments to demonstrate his theory, but the principles he laid down may be the general explanation for such special cases of "artificial cells" as those shown by Dr. George W. Crile at the Cleveland meeting of the American Association for the Advancement of Science last winter.

The growth and division of the imaginary, artificial, lifeless cells were all accounted for by Dr. Rashevsky on the simplest of physical assumptions. That a cell may keep its shape intact through changes was also explained.

"One of the most fundamental phenomena of life, if not the most fundamental one," said Dr. Rashevsky, "is the multiplication of a cell through division. All the facts of growth and multiplication of more complicated and highly developed organisms reduce in the last analysis to the growth and division of single cells."

Instead of attempting to give a detailed theory of such complicated phenomena, Dr. Rashevsky decided to investigate first some intentionally over-simplified cases, which are never found directly in nature. It is through the study of intentionally over-simplified arrangements that progress has been achieved in other exact sciences.

"Let us for a moment forget about actual living cells," Dr. Rashevsky said, "and investigate mathematically whether it can happen, and, if so, how it can happen, that a small liquid drop will spontaneously divide into two parts.

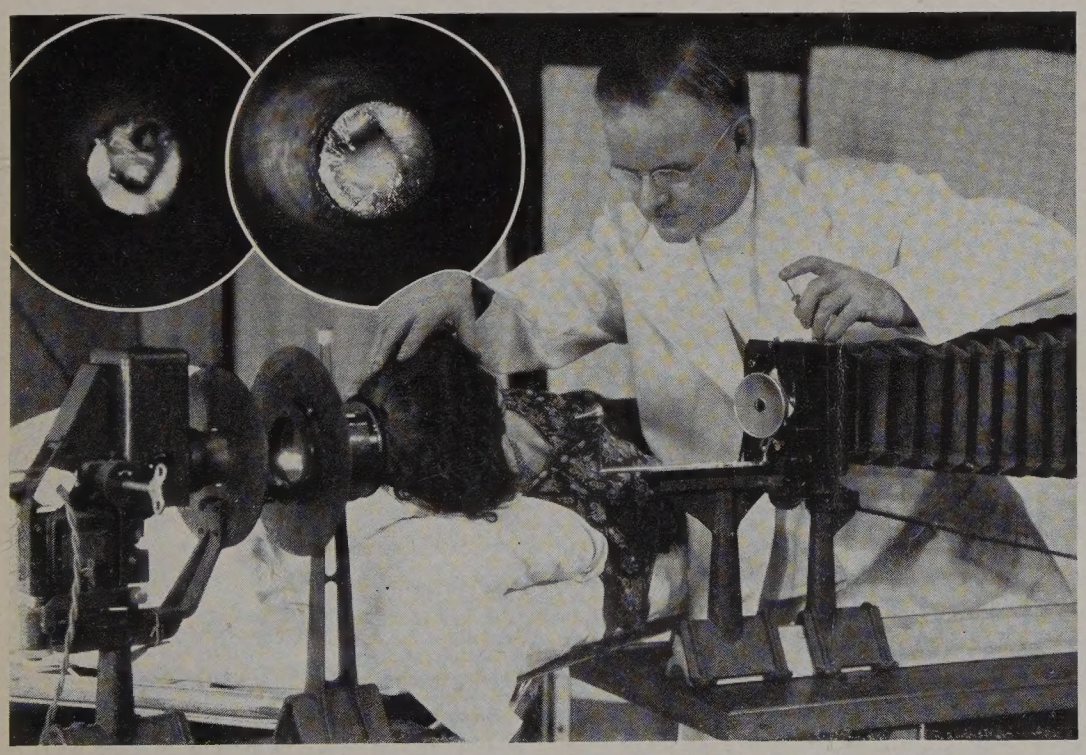
"It is found that such spontaneous division cannot occur, if the drop is in a perfectly resting state and is not undergoing any changes.

"Consider the case that a drop, which is surrounded by another liquid, interacts chemically with this liquid, so that the amount of liquid which constitutes the drop increases, just as would be true with a small organism. If the drop thus grows at the expense of certain substances, contained in the surrounding liquid, then under some very general conditions, the drop will divide into two on reaching a certain size. Each half will then again grow up and again divide and so on."

Generations of droplets showing an evolution to more and more complicated chemical constitution can thus be formed without the interference of the experimenter. This happens when the intervals between the successive divisions are unequal.

The number of drops may increase continuously as long as substances necessary for growth are in the surrounding liquid. "Life" persists so long as "food" is available.

Science News Letter, May 9, 1931



PHOTOGRAPHING THE INNER EAR WITH COLD LIGHT

The insert to the left is a photograph made with the new camera of a diseased ear while the other insert shows a healthy ear.

MEDICINE

Cancer Kills More Quickly As Blood Alkalinity Rises

Blood Condition May Enable Physicians to Predict Success Of Treatment and Course of Disease

STUDIES of far-reaching significance which may lead to the solution of the cancer problem have just been reported by Dr. Ellice McDonald, director of cancer research at the University of Pennsylvania Graduate School of Medicine, Philadelphia, and his associates, Gladys E. Woodward, Janetta W. Schoonover, Edith G. Fry and Edward G. Torrance.

The blood of patients with untreated cancer is more alkaline than normal, they found. This increased alkalinity seems to be related to the speed with which the disease will kill the patient.

"The greater the alkalinity, the quicker the disease kills," said Dr. McDonald.

Treatment by X-rays or radium, which may cure or at least retard the disease, affects the alkalinity of the blood.

These observations, reported in the forthcoming issue of the *Journal of Laboratory and Clinical Medicine,* indicate that in the condition of the blood may be found a means of predicting the course of the disease and the success of treatment. Likewise a new method of treatment may be developed which would turn out to be the long-sought specific cure for this malady.

"The important point is that environmental conditions outside the cell influence the course of the disease," Dr. McDonald commented.

Cancer is a disease in which cell growth is abnormal. Cancer cells have been called wild cells because of their erratic growth. Scientists have been studying the cells microscopically and with moving picture cameras in the hope of finding what makes some cells turn into the wild, cancer cells. It appears from Dr. McDonald's report that the cause of their erratic growth is to be sought outside the cell and in the surrounding tissues, and the blood.

"The state of the blood in cancer is of great importance because cancer becomes a systemic disease and cancer cells receive their nourishment from and give off their waste products to the blood," his report begins. "Therefore it is to be expected that the blood of cancer patients should differ from normal blood."

The difference, Dr. McDonald and associates found, is in the degree of alkalinity. The average alkalinity of the blood in the 26 untreated cancer patients studied was 13 per cent. above the normal. The alkalinity of blood or other biochemical solutions is determined by measuring the concentration of hydrogen ions. This is called in the chemists' shorthand, PH.

"Alkalosis of the blood plasma of untreated cancer patients seems to have a bearing upon the duration of their lives, or duration of life is a function of PH. In the series, the more alkaline the blood plasma of untreated cases, the worse the prognosis. Warning should be given in applying this rule to patients whose PH may be modified by treatment, complications or medication," Dr. McDonald's report stated.

The diagnosis of cancer in the patients of the study was confirmed by examination of a small piece of tissue removed from the tumor, or by post mortem examination of the patient's body.

"This is very far reaching in the future study of cancer," Dr. McDonald declared. "In marine eggs, if the balanced sea water is made more alkaline, the rate of division and multiplication is increased and vice versa. The analogy holds for cancer and the obvious is to attack the disease through the blood or environing fluid, which may have some hope of success."

Encouraging as is this statement, it should be clearly understood that a cure for cancer has not yet been discovered.

Science News Letter, May 9, 1931

CHEMISTRY

Gas Made Non-Poisonous By Famous German Chemist

CARBON MONOXIDE, the ingredient in ordinary household gas that makes it poisonous, can be extracted by a new process invented by the noted German chemist, Dr. Franz Fischer of the Coal Research Institute at Mülheim, Germany.

Dr. Fischer's process consists in passing the gas through sewage sludge, which swarms with bacteria. These remove the carbon monoxide and recombine the carbon with hydrogen, returning it to the gas as methane, which has a high fuel value and is not poisonous.

Science News Letter, May 9, 1931

PHYSICS

Five Hundredth of an Atom's Diameter Measured Exactly

A NEW LOW in the measurement of extremely small lengths was announced to the meeting of the American Physical Society in Washington last week by Prof. Arthur H. Compton, Nobel Prize laureate and University of Chicago physicist.

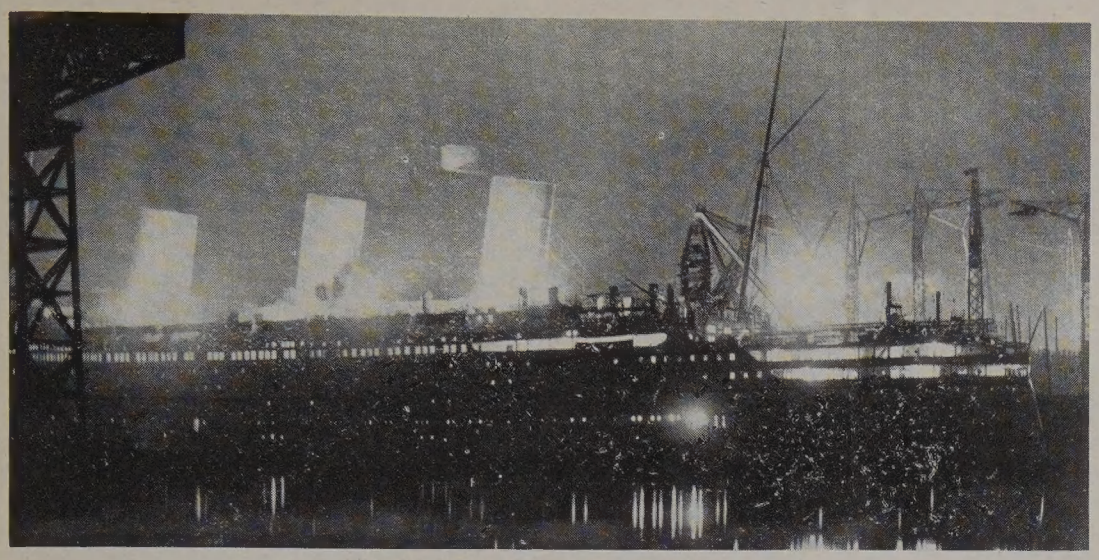
He has measured the length of waves in the X-rays correct to the five-hundredth part of the diameter of a single atom. In inches this length is much lower than we can conceive. It is the hundred thousandth part of the millionth of an inch.

The wave length itself measured by this process was about 700 atom diameters, and was thus known with an accuracy of one part in 300,000.

The measurement, said Prof. Compton, is made with an instrument known as a double X-ray spectrometer. In a spectrometer the rays fall on a crystal which breaks them up into their constituent vibrations. By noting the angle at which these leave the crystal the wave length, that is the distance from crest to crest of the vibrations, can be estimated with extreme accuracy.

A double spectrometer, a recent refinement, is even more powerful in searching out these small distances.

Science News Letter, May 9, 1931



MOBILE BEACON OF THE SEAS

An innovation in ocean navigation is the floodlighting of the towering funnels of a vessel so that they will serve as super-beacon for aircraft and for nearby ships. It will be possible to see these lighted stacks of the new "Empress of Britain" during her crossing May 27-June 2 for a distance of 30 miles—more than an hour before the vessel comes in view. The reflection against a low ceiling at night will be visible even greater distances and flyers 1000 feet up will be able to see the funnels from more than 50 miles

PSYCHOLOGY

Hair and Eye Color Are Index To One's Emotional Behavior

PHYSICAL differences in the color of eyes and hair and shape of head, which are usually associated with different races, have a relation to the extent to which persons get angry or become afraid, Dr. G. M. Stratton reported to the National Academy of Sciences in Washington last week.

Dr. Stratton based his conclusions on a study of more than 1,000 students at the University of California, where he is professor of psychology. Measurements were made of the heads of these students; their hair was classified as light, medium, or dark, using a scale of actual samples; and the eyes were similarly classed as pure blue or gray, pure brown or black, or intermediate or mixed.

In order to find out how emotional the persons studied were, Dr. Stratton gave each one a list of situations which might make one person extremely irritated or frightened, while another would not be disturbed. Each person was given also a precise description of different degrees of reaction to a situation. And immediately after the reaction actually took place, he noted its degree in the particular case.

"Taking only shade of hair," Dr. Stratton said, "There appears to be a difference, with respect to their emotions, between the group composed of the dark-haired and the group composed of the medium-haired; and, again, between the medium-haired and the light-haired. The dark-haired have more intense fear than have the medium-haired; the medium-haired are more intensely angry than are the light-haired.

Anger and Eye Color

"Taking only eye-color, the light-eyed, when subjected to similar external incitements to anger, are more intensely angry than are the medium-eyed.

"And looking to head proportions only, the narrow-headed, who will not, I hope, be confused with the narrow-minded, are more intense both in anger and in their fear than are either of the other groups; in like situations, the narrow-headed become angrier or more afraid than do those whose heads are are of medium proportions or are broad. The medium heads are the least emotional of our three groups; the narrow heads are the most emotional; the broad heads fall in between . . . .

"In all this, one may notice, the findings lend themselves happily in part but not entirely to the usual descriptions of the three main stocks within the Caucasian race . . . . If race were the ruling factor in the present findings, we should expect, then, that the emotional characteristics of the light-haired would be those also of the light-eyed. But the present findings run contrary to this expectation. The light-haired are less irascible than their fellows, while the light-eyed are more irascible."

The evidence, he feels, indicates that in persons with these different physical features, there are innate differences in emotional disposition.

Science News Letter, May 9, 1931

ASTROPHYSICS

Magnetic Storms Most Frequent At Equinox

ALTHOUGH the old idea of "equinoxial storms" of wind and rain has been pretty well consigned to the Limbo of exploded myths, equinoxial storms of another sort, not noticeable with the naked eye, seem to be scientifically established phenomena. At the meeting of the American Physical Society in Washington last week, Dr. H. B. Maris of the U. S. Naval Research Laboratory reported that a study of magnetic storms, invisible disturbances that periodically play hob with telegraphic communications, are thicker at the spring and fall equinoxes and scarcer at the times of summer and winter solstice. The figure at maximum is roughly double that at minimum.

The periodicity in the distribution of these invisible but none the less powerful storms is so regular that their curve can be projected into the future and predictions ventured. Dr. Maris said that the chances are about two to one that May 16 will be the most disturbed day of the month so far as the earth's magnetism is concerned.

Science News Letter, May 9, 1931

HORTICULTURE

Orchid Greenhouse Rotates To Catch Full Sunlight

A GREENHOUSE set on roller bearings and kept slowly rotating to give its green tenants full benefit of the sun at all hours is the invention recently patented by Albert C. Burrage, an orchid grower located near Boston.

Although the whole house is only twelve feet square at the floor, its shelves accommodate 10,000 seedling hybrid orchids, each in a one-inch pot. It is believed to be the first rotating greenhouse ever constructed.

Science News Letter, May 9, 1931

PHYSICS

2,000 Volts to Produce Million Volt Ions

A NEW method of producing million volt ions, of the same immense speeds as found in radium alpha-rays has been devised by Drs. E. O. Lawrence and M. S. Livingston at the University of California, and announced by them to the meeting of the American Physical Society in Washington last week.

The high speed hydrogen particles are produced without the use of high voltages such as have previously been necessary in making artificial radium radiations. An ingenious method of multiplying the voltage has produced 80,000 volt hydrogen molecule ions in these experiments although only 2,000 volt oscillations were employed.

The charged hydrogen atoms spiral around inside two hollow semi-circular plates in a vacuum. Great magnets placed outside the plates cause the particles to follow the curved paths, and the particles resonate in tune with the oscillations of the applied voltage.

Each time the particles pass from the interior of one plate to that of the other they gain energy by the same constant amount determined by the voltage applied. At each revolution then the speed is increased.

Dr. Lawrence stated that there are no difficulties in the way of producing one million volt particles in this manner. A larger magnet is at present under construction at the University of California for this purpose.

Science News Letter, May 9, 1931

PHYSICS

Physicists Learn to Focus Stream of Electrons

HOW TO FOCUS streams of electrons as though they were rays of light was told the National Academy of Sciences last week by Dr. C. J. Davisson and C. J. Calbick of the Bell Telephone Laboratories.

The infinitesimal bits of electricity, which with their opposite twins, the protons, are the building blocks of all matter, are shot out in straight lines from hot wires and similar objects, and streams of them are very useful laboratory weapons in unlocking the secrets of the atom. But hitherto they have insisted in traveling in straight lines. The most they would do was bend aside a little when exposed to an electrical field. They could not be focussed and brought to a point, like light passing through a lens.

Dr. Davisson and Mr. Calbick enclosed an electron-radiating wire in a cylinder, electrically charged. In the wall of the cylinder was an opening. Electron streams that came through this opening were spread outward, like light passing through a concave lens. They were "negatively focussed"; the beam was made wider.

But for most experimental purposes one wants a narrower rather than a wider beam or ray. The focus must be brought to a point. To accomplish this, the two physicists enclosed the first cylinder inside a second, with a higher electrical charge. This caused the fan-shaped electron stream to close up again, getting narrow and coming to a point wherever the experimenters desired.

Science News Letter, May 9, 1931

ARCHAEOLOGY

New Kind of Old Art Found in European Church

SOMETHING new under the sun, something a thousand years old, is the picture of a saint wrought in colored marble inlay which has been unearthed in the church of St. Mary the Immaculate in Istanbul, by the Turkish National Museum.

The technique of this tenth century icon is pronounced heretofore unknown to modern science. The icon is a full-length portrait of St. Eudokia, about two feet tall. The entire picture is made of small pieces of colored marble fitted into place against a background of white marble. The face and hands are pink, with features marked in. The long dress is purple and green, elaborately trimmed in designs of bright colors, all worked out in the marble mosaic. A halo back of the saint's head is yellow.

The church in which this Byzantine icon was found has had a checkered history. Ruins of the early structure which stood on the site in the sixth century A. D. were unearthed, with the notable discovery of rare sculptures representing the apostles. In the tenth century, and later, elaborate reconstructions were made in the building, and in the fifteenth century the church became a mosque.

Several other pieces of the remarkable marble inlay work, similar to the figure of St. Eudokia, were found buried among rubbish at the site.

Science News Letter, May 9, 1931

IN SCIEN

OPTICS

Contact Eyeglasses Beautify Dull Eyes

"WOMEN who have pale grey or blue eyes can have them darkened to any desired degree by contact glasses," Prof. Leopold Heine of the University of Kiel has reported to the *Lancet,* British medical journal. Contact glasses are thin shells of optical glass which can be worn under the eyelids in contact with the eyeball. They cannot be distinguished, which gives them a cosmetic value very pleasing to women and to actors.

Prof. Heine, who has been studying their uses to correct different kinds of visual disturbances and eye diseases, reports that they are indicated in certain occupations and should be tried by architects, seamen, pilots, chemists, actors, engineers, sportsmen, bicyclists, swimmers, motorists, gymnasts, sailors, tennis players and those who hunt.

Science News Letter, May 9, 1931

ARCHAEOLOGY

Archaeologists to Dig At Promising Site

THE University of Illinois has obtained a permit to excavate the Indian cemetery near East St. Louis, where a contractor has reported uncovering four skeletons in good condition, and traces of other skeletons remaining in place.

Excavation at the site will begin at once, Dr. A. R. Kelly, archaeologist of the University of Illinois, stated.

The graves are on bluffs overlooking French Village near East St. Louis, Dr. Kelly said. Men who have dug and carted dirt away from the locality in the past two or three years have occasionally found human bones. How much of the cemetery remains is not known.

It is hoped that scientific excavation of the site will give new information of the type of culture possessed by the bluff dwellers as compared with the culture of valley tribes. The cemetery is expected to add to the information regarding the famous Cahokia mound-building group.

Science News Letter, May 9, 1931

E FIELDS

AERONAUTICS

Improved Wind Tunnel For Testing Canadian Planes

INCREASED efficiency in wind tunnels for testing model airplanes, and findings important to the science of heating and ventilating have been realized through a research project conducted by the National Research Council of Canada.

In constructing a new wind tunnel to assist in the design and construction of airplanes in Canada, J. H. Parkin, assistant director of the Division of Physics in charge of aeronautics, took advantage of the recent discovery that tunnels with square corners, when fitted with vanes, offer less resistance to air currents than do rounded corners. By simplifying the vanes, the staff of experimenters appointed to the work constructed a tunnel which is more economical and efficient than the ordinary tunnel.

The experiments were conducted by George J. Klein, K. F. Tupper and Dr. J. J. Green. While the object of the research was primarily to perfect methods for testing the effect of air currents on high speed craft, the new data on air flow has been seized upon by manufacturers of equipment for heating and ventilation.

Science News Letter, May 9, 1931

SEISMOLOGY

Eight Quakes in April Bring Year's Total to Forty-Four

WITH a series of eight earthquakes, culminating in the destructive Caucasus shocks at the end of the month, April has maintained the high earthquake record of the first quarter of 1931, and has followed the example of the preceding month, which ended with the wrecking of Managua on March 31. The total of major earthquakes for the year, up to May 2, now stands at 44.

Last month's quakes occurred on April 4, 6, 15, 19, 20, 22, 24, and 27. The last date was that of the destructive quake in the Caucasus region; though the telegraphic reports of it did not come out from Moscow until the twenty-ninth. None of the other seven quakes, fortunately, caused any notable damage to life or property. One, a very mild one, rattled dishes and doors and cracked a few ceilings in the Hudson and Mohawk valleys in New York State. This was on the twentieth. The second and third quakes of the month, on the sixth and fifteenth respectively, were midocean earthquakes on opposite sides of the earth. The first agitated the Pacific ocean bottom almost on the equator, in the neighborhood of the Caroline islands, and the second occurred in the Atlantic, a little west of the Azores.

The first earthquake in May was reported on Saturday, the second. Its epicenter was located in interior Venezuela.

Science News Letter, May 9, 1931

ORNITHOLOGY

Sea Eagle Eats Mice But Disdains Fish

A SEA EAGLE that does not eat fish is the anomaly reported by Prof. I. Aharoni of the Hebrew University in Palestine, in a communication received by the New York office of the University.

Prof. Aharoni captured several specimens of this eagle on a recent zoological collecting trip to the Lake of Antioch in Syria, a body of water known from antiquity but little explored by scientists. On examining their stomach contents he found the bones of mice and birds in considerable quantity, but no traces of fish, in spite of the fact that this species is never found far from large bodies of water.

Another very peculiar bird found on this trip was the Syrian darter, known locally as the oustalet. This is a waterfowl, nesting among the tremendously high reeds that cover the wide lake flats. Its nesting season is governed by the height of the lake, for it cannot build until the water has got low enough for it to break down the reeds. Then it piles up a criss-cross structure of stems with their sharp ends pointing outward, forming a formidable defense against many of its enemies.

On this collecting trip around the Lake of Antioch, and from Mount Scopus itself, where the university is located, Prof. Aharoni gathered a large number of specimens for the museum of the University of Jerusalem. Some of these are quite new to science, while others are of classical interest.

Science News Letter, May 9, 1931

NUTRITION

Setting-Up Exercises Are Poor Weight Reducers

ONE FIFTIETH of a teaspoon of sugar or other carbohydrate, approximately, is required to furnish the energy used by a man in doing ten times the "push-up" exercise familiar to daily dozen addicts. Women need even less sugar to do the same exercise.

Studies of what it costs in energy to do this familiar gymnastic routine were reported to the Federation of American Societies for Experimental Biology by Dr. H. E. Hamlin of Ohio State University. Each push-up for the men is equivalent to the energy required to lift 18 pounds 100 feet high. For the women the energy is equivalent to lifting 12.5 pounds 100 feet high.

Figured on the basis of push-up per pound of body weight, the energy cost for the men was 0.0040 Calorie and for the women 0.0033 Calorie. In calories the ten push-ups cost the men 5.9 Calories and the women 4.1 Calories. The men would therefore consume the energy equivalent of 1/325 pound of sugar in doing the ten push-ups, and the women 1/450 pound. The conclusion is that "reducing" by setting-up exercises alone is almost impossible.

Science News Letter, May 9, 1931

PHYSICS

Tube Length Measured For New Light Speed Test

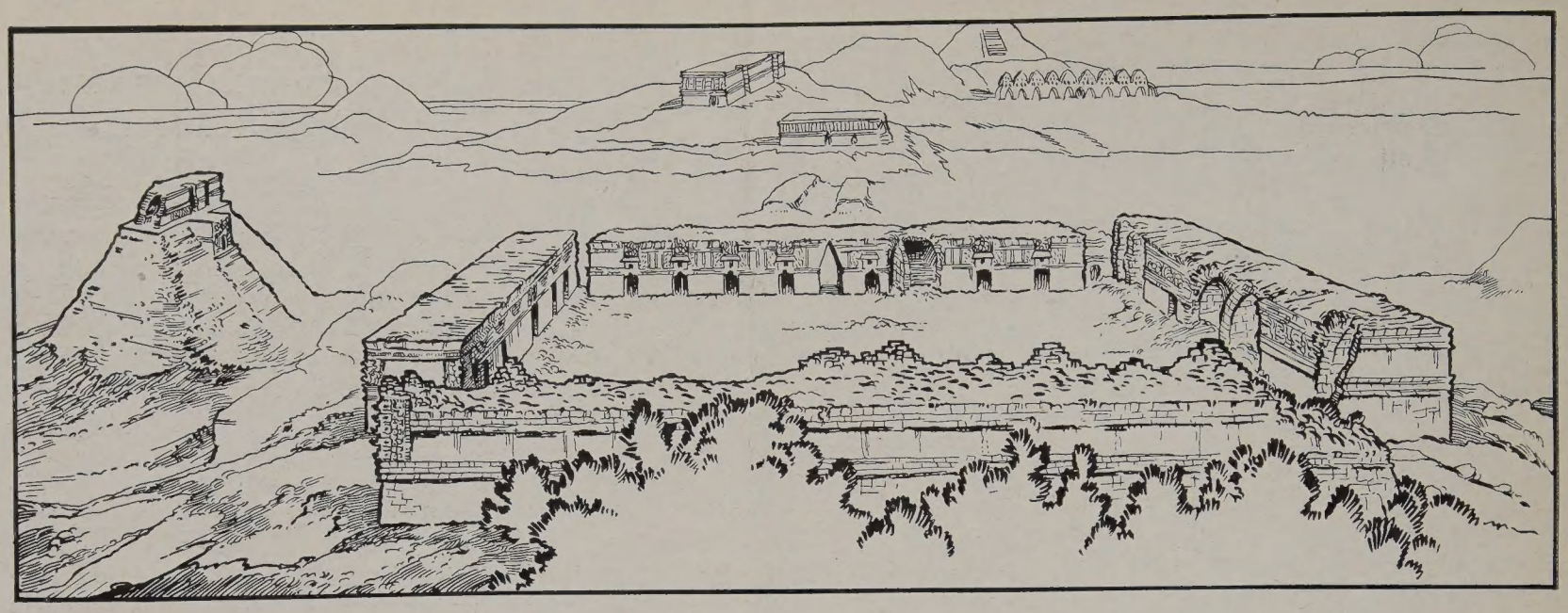
THE MILE-LONG tube at Pasadena, Calif., to be used by Dr. Albert A. Michelson of the University of Chicago for his new determination of the velocity of light, has had its length measured to an accuracy of one part in a million.

The result was announced to the meeting of the American Geophysical Union in Washington, last week, by Dr. William Bowie, chief of the division of geodesy of the U. S. Coast and Geodetic Survey. The measurement was made by Clem L. Garner, assistant chief of the same division.

The tube is approximately 1,594 meters in length, said Dr. Bowie. The 50-meter tapes used in the measurement were made of invar, a metal which changes its length very little with changes in the temperature. They were standardized in Washington.

The air will be removed from the tube for the speed measurement.

Science News Letter, May 9, 1931



Indian Virgins of the Maya city Uxmal lived in the Nunnery Quadrangle in the foreground of the panorama of the city reproduced at the top of the page. The temple served by the Indian maidens is at the left.

ARCHAEOLOGY

Home of America's Vestal Virgins

By EMILY DAVIS

AMERICA had its Vestal Virgins, a thousand years ago.

Like the Vestal Virgins of ancient Rome, the Virgins of ancient America served the temple of a deity. Their chief duty, as the name implies, was to tend the sacred fire, and woe to the maiden who let the fire die out while she was its guardian. Death by arrows was the penalty.

These American Vestals were Indian girls of the Mayan race. They wore cotton robes and sandals, and ornaments of jade and gold and turquoise, and doubtless, also, garlands of gay, exotic flowers, for their home was in the tropics, in the Yucatan peninsula.

The Indian Vestals were people of importance. In the cities of the Maya, built by patient workmen who learned to pile up great stone edifices and to carve and paint them most elaborately, the temples were the chief of all buildings. The entire Mayan government was a theocracy, in which the priests held positions of great power. All the astronomy and the learned writings at which the priests labored were inextricably mixed up with the affairs of the gods and the gods' will for the people. In such cities, naturally, the temples were the most conspicuous and most important centers of activity. The stone temples, beautifully carved and brightly painted, were set high on pedestals shaped like pyramids, so that the temple might appear remote and lofty and a fitting resting place for the gods. It was in such temples as this that the Indian Vestals held their important posts.

In one city of the Maya, the Indian temple maidens seem particularly real. That city is Uxmal, pronounced Ooshmahl. At Uxmal stands a Nunnery where a large community of temple maidens lived. The stone cells where they slept and worked at their tasks and the court where they walked are still to be entered and examined by the traveler who goes adventuring to the ruins of Yucatan.

The old Nunnery consists of four long buildings set around a large courtyard. The buildings contain 88 cells and rooms.

Close by the quadrangle of the nuns rises a tall pyramid base, and on this stands the temple where the maidens performed their duties. The pyramid is now a confused mass of stones, weeds, and trees. But in its day it was an impressive monument with a stone staircase no less than 70 feet wide leading to the temple perched on the top. Up ninety steps to the sanctuary we can imagine the maidens climbing with dignity, bearing garlands, or sacrifices, carrying the container of the sacred fire, or escorting a procession of the priests.

The temple of the maidens is called nowadays the House of the Magician or the House of the Dwarf, not for any historic reason, but because of a long native legend which associates the ruins with a dwarf, an old woman, and much magic. All of the well-known ruins of Uxmal have such picturesque names, bestowed by modern explorers and natives. Uxmal has among its ruins a Governor's Palace, a House of the Old Woman, a House of the Pigeons, and a House of the Turtle. Of all the ruins of the city, only one building is labeled with historic certainty. That one is the Nunnery.

Revealed in Old Manuscript

An old Spanish manuscript, written with the aid of some ancient documents long since vanished, tells of the Nunnery and the maidens who lived there, who were like the Vestal Virgins of Rome. This Spanish historian, Father Diego Cogolludo, writing in the wondering style that characterized so much of the early Spanish writing about America, said:

"In Uxmal there is a large patio with many rooms separated in the form of a cloister where these virgins lived. It is a work worthy of admiration, because the exterior of the walls is all of worked stones, where there are brought out figures of armed men in bas-relief, a diversity of animals, birds, and other things, and it has not been made out who were the artificers, nor how they were worked in this land. All of the

four fronts of the buildings of that patio are encircled by a snake worked in the same stone as the walls, the tail terminating under the head, and being in all its circuit four hundred feet."

Today, even in its ruined state, the Nunnery is so beautiful an example of prehistoric American architecture and of such romantic interest besides that it has been selected to represent the Mayan age at the Chicago World's Fair of 1933. Several acres of land have been set aside for this purpose. On this land, archaeologists and architects are to build a copy of the Nunnery Quadrangle, with as much of the atmosphere of a Mayan city of a thousand years ago as they can capture and reproduce.

As a first step toward this project, a Tulane University expedition, led by Frans Blom, well known archaeologist and specialist in Mayan affairs, has spent some time at Uxmal studying the ruins.

Cells that were occupied by Indian nuns when the city was a living thing have again been occupied, this time by members of a twentieth century scientific expedition. The stone-walled rooms were cool and comfortable.

The staff set to work measuring and photographing all the buildings of the Nunnery Quadrangle. Casts of the sculptures were taken, and seventy architectural drawings were made to provide detailed plans of the entire structure.

While the architect of the expedition, Prof. J. Herndon Thomson of Tulane University, was studying the Nunnery and examining other ruins about the city, he made some surprising new discoveries. These discoveries show that the builders of Uxmal had mastered some of the most subtle tricks of the architectural trade, so to speak. Tricks of perspective, applied in Uxmal's buildings, are as clever as those practiced by the temple designers of ancient Greece.

The city which built so magnificent a Nunnery for its temple maidens was one of the leading cities of the Mayan Empire in Yucatan. It is today a city that is well known and that is probably very little known. This paradox is explained by the fact that many of Uxmal's ruins stand well above ground and are so beautiful that they have become famous, yet at the same time comparatively little excavating has been done to find out what may lie hidden beneath the ruins or beyond them.

Types of People in Stone

When Mr. Bloom explored a single large terraced mound in the center of the city, he found in it no less than nineteen highly important monoliths, great tablets of stone with carvings on them. On the stone monuments are cut human figures showing the types of people who lived in Uxmal centuries ago, and on some of the tablets, too, are bands of hieroglyphics recording dates in the Mayan method of stringing together a series of picture symbols.

A dramatic incident had happened on this monument hill at some unknown time, Mr. Blom's researches showed. In the center of the terrace on which the monuments once stood was a deep hole, like a shell hole. The monuments had been thrown out from this hole on all sides. From this it is inferred that a treasure hunter went hunting at this site with dynamite, at some time. If so, the vandal seeker of gold failed to realize that the carved stones all about him were a find of great interest, though not the financial haul he was seeking.

The monuments with their carved inscriptions prove that Uxmal was in existence in 500 A.D. Heretofore the city has been thought to date from the year 1007 A.D. Reading the new-found inscriptions, therefore, was like adding five centuries to the age of the city, all at one stroke.

Mr. Blom's explorations at Uxmal carried him off in some tours of scouting around the fringes of the known ruins. And there, too, he found the unexpected. Twenty-three groups of buildings not heretofore recognized were found off in the jungle growth away from the cleared section. All of which shows that Uxmal is not only an older city than anybody thought, but a much larger one.

By the time Father Cogolludo came to Uxmal and wrote his description of the Nunnery, the city was abandoned, though he was told a good deal about its grandeur and its history. The Spaniard climbed up the steep way to the

MODERN MAYAN GIRLS

Of this type were the Vestals of prehistoric America.

CHOSEN TO REPRESENT MAYAN AGE

Because of its beauty and romantic interest the Nunnery of the Virgins will be reproduced at the Chicago World's Fair in 1933 as representative of the Mayas. The photograph shows workers copying details of the original.

top of the temple by the Nunnery and found there some of the figures of the gods which the Indians had worshipped. Indians were still worshipping these idols, the priest feared, for he found offerings of copal incense and cacao which had been made there not long before his visit.

Even today, Uxmal is a place of religious reverence and fear to the modern natives of Yucatan. The ancient houses of Uxmal are invoked in a prayer of an Indian ceremony to the gods of the harvest. And at the Temple of the Magician and the Nunnery, rumor says, the carvings on the walls become animated at night and walk abroad. And that, like other paradoxes of Uxmal, is said to be because Uxmal the religious was not religious enough. The old story goes that the god who reigned in the Temple of the Magician was long patient with his people when they neglected him. At length, however, his patience was outworn and he angrily turned the population of the city into stone, and waved them up to the walls to serve as decorations for the buildings. There they remain, except that at evening they are set free to wander about the ruins of their beautiful, lost city.

(This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1931, by EveryWeek Magazine and Science Service.)

Science News Letter, May 9, 1931

PSYCHIATRY

New Self Respect Sought For Dementia Praecox Patients

A SIMPLIFIED method of handling patients suffering from the type of insanity known as dementia praecox has been reported to the American Medical Association by Dr. R. G. Hoskins of the Worcester State Hospital, Worcester, Mass. Dr. Hoskins has formulated the disease so that persons untrained in psychiatry can get a general understanding of what the disease is and how the patient should be treated.

About one-fifth of all the hospital beds in the United States are required for victims of this disorder. The economic loss in the United States alone is approximately a million dollars a day, Dr. Hoskins estimated. The cost in human misery is incalculable.

Dementia praecox is a persistent dream state, Dr. Hoskins explained. It results from loss of self-respect due to failure to meet one's personal standards. It occurs in sensitive subjects as a defensive reaction. It is accompanied by a sense of isolation. Loss of self-respect makes existence intolerable in a world of reality and the sufferer escapes from it into the dream state as much as possible.

Methods to Follow

Treatment should be directed toward building up the patient's self-respect. This is done in various ways: by building up his physical health and strength so that he will have plenty of energy for meeting his standards; by correcting the standards themselves if they are impossible of achievement; by teaching him an improved technic for using what energy he has; by helping him to accomplishments in sports or work which he himself values; by encouraging him in personal cleanliness and neatness; and by giving him attractive surroundings and possessions in which he can take pride.

The attitude of others about him, nurses and attendants and relatives, should be sympathetic and respectful, Dr. Hoskins emphasized.

While many other factors enter into the cause and treatment of this deplorable condition, Dr. Hoskins' formulation of it is intended to give the general practitioner, nurses, attendants and relatives of the victim of dementia praecox a practical knowledge of the disease.

Science News Letter, May 9, 1931

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PHYSIOLOGY

Man Must Use Brains To Sleep Normally

NO BRAINS, no ordinary sleep. Dr. N. Kleitman of the University of Chicago came to this conclusion in experiments reported to the Federation of American Societies for Experimental Biology.

Use of the brain is necessary in order to sleep in one long stretch each 24 hours as human beings and most animals do in the more mature parts of their lives. This was shown by Dr. Kleitman's experiments on dogs. Newborn puppies, little babies, and adult dogs completely deprived of the cortex of the brain through an operation sleep the same way. They eat and have a period of almost incessant activity and then the sleep, not just once in each rising and setting of the sun but several times.

People and dogs, Dr. Kleitman has concluded, must actually use their thinking mechanism, the cerebral cortex, and learn to sleep in the manner that most of us consider quite automatic and unconscious. Puppy or baby sleep or periodic napping does not need brain work, but keeping awake all day and sleeping all night soundly without waking is an acquired habit, in Dr. Kleitman's opinion, depending upon the brain's cortex for its establishment and maintenance.

Science News Letter, May 9, 1931

ORNITHOLOGY—AVIATION

Birds Excel Man's Airplanes As Efficient Flying Machines

THE DUCKS that wing their way northward through the March dawn, the hawks that hang and watch for a chance to pick one of them off, even the robins and blackbirds that flit across the lawns, are still more efficient flying machines than the best of man's inventions. They have better design, and they get more mileage out of a calorie of energy, than any airplane now in existence or likely to be built.

This is brought out in a number of points in a study of bird flight which has been made by Dr. Lucien H. Warner of White Plains, N. Y. His findings were published in the *Quarterly Review of Biology.*

Birds have so reduced the weight of other body-parts that they can devote from one-sixth to one-half their total weight to the flying muscles, notably the big ones that form the breast of the bird and pull the wings on the down-stroke. In the pigeon these muscles weigh as much as all other parts of the bird taken together.

The streamlining of birds' bodies has long been noticed. It shares this low-resistance shape with fishes and other swimming animals, but has the advantage of smoothing out hollows and irregularities with almost weightless feathers instead of heavy flesh. Many flying birds tuck up their feet, being prototypes of planes with retractile landing gear, and those that are too long-legged for this trail their legs so as to make the least possible resistance in flight.

Get More Out of Food

Highly efficient also is the utilization of food by birds, and its combustion in the tissues to produce energy. Analysis of food remains after digestion shows that birds assimilate much more of what they eat than do mammals. Their blood carries a higher number of red corpuscles per cubic millimeter, and therefore transports more oxygen to the final burning-places of dissolved foods, which makes for more efficient energy production.

Birds have a system of breathing peculiarly adapted to the needs of flying animals. The active part of respiration is exhalation, or breathing out. This is accomplished by compression of the ribs and breastbone, which surround the lungs. Thus the more rapidly the wings are moved, the greater the amount of air forced in and out of the lungs. A bird is thus less likely to get out of breath than is a mammal, which has a breathing apparatus quite independent of its movement muscles.

Dr. Warner also discusses the different methods of flight used by birds, and offers a new theory regarding the soaring flight of such birds as hawks and buzzards. It is his belief that they take advantage principally of the gustiness of the wind, adjusting themselves instantly to changes in its direction or force in such a way as to exploit its energy to gain additional lift.

Science News Letter, May 9, 1931

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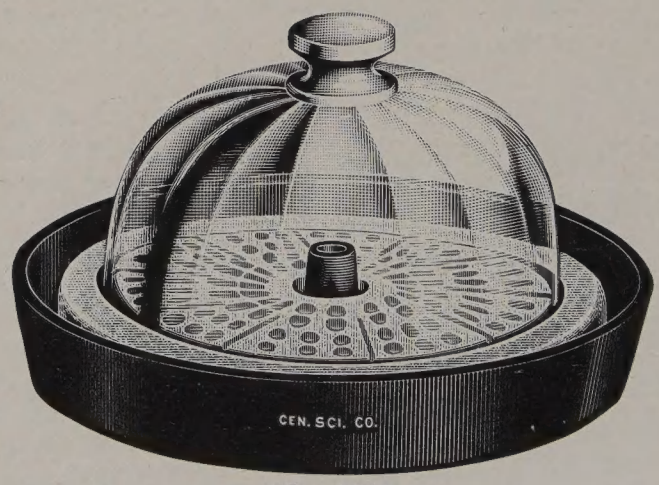

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AGRICULTURE

Tropical Disease of Cattle Gains Foothold in U. S.

CATTLE in portions of the United States, notably in the warmer states in the Southwest and along the Gulf Coast, have been dying from a tropical disease that probably invaded this country years ago but which has only recently been recognized.

Researches on the problem by George W. Stiles, Jr., of the U. S. Department of Agriculture, showed that the ailment is anaplasmosis, a disease prevalent in many of the tropical countries of the world. Cases in this country have been found in the following states; Arizona, Florida, Louisiana, Texas, California, Nevada, Kansas, Oklahoma and Missouri. It is considered probable that it exists in other states as well.

The symptoms are so much like those of tick fever that cattle afflicted with anaplasmosis have undoubtedly been charged up to the score of the older and better known disease. There is an initial high fever, which does not last long, accompanied by a rapid, tumultuous pulse. The cow "gets poorly," "goes dry," and "loses her cud." There is a great loss of flesh. Severe anemia sets in, the red corpuscle count falling as low as one-eighth normal. Between a third and a half of all cases end in death.

No Danger to Humans

There seems to be no danger to human beings in handling anaplasmotic animals; so far as is known at present the disease attacks only cattle. Researches to date incriminate a number of species of tick as carriers of the infection, and point suspiciously, but without conclusive evidence, at a horsefly.

The disease is also transmitted in smears of blood on carelessly handled dehorning saws. It is strongly advised that all veterinary instruments be thoroughly cleaned and sterilized between uses on different animals, to eliminate this source of infection.

Anaplasmosis is caused by the attack of a microscopic animal parasite, known as *Anaplasma marginale*. This germ gets into the blood, multiplies, and invades the red corpuscles. In mild cases only one per cent. or so of the corpuscles will show the dark spots that betray the presence of the parasite, but in severe cases from 25 to 50 per cent. will be affected.

Unfortunately, cattle that have had the disease and recovered continue to harbor the germs in their blood for a long time, thus becoming dangerous "carriers" of the infection.

Science News Letter, May 9, 1931

PUBLIC HEALTH

Health Officials Act On Methanol Regulation

SAFEGUARDING the public health from possible deleterious effects of methanol or wood alcohol used as an anti-freeze in automobile radiators was recommended in a resolution passed by the Conference of State and Territorial Health Officers with the U. S. Public Health Service in Washington. The resolution was based on a report of the committee appointed by Surgeon General Hugh S. Cumming.

The committee feels that the use of methanol should be surrounded by the necessary safeguards through agreement of the Public Health Service with the industry.

"If such an agreement cannot be reached," the report states, "the Surgeon General is requested to inform the several state departments of health of that fact and suggest to them such standard safeguards as he deems necessary for the protection of the public health as a basis for state laws and sanitary regulations."

The safeguards necessary to protect the public health from this new menace will be based on the findings of investigations that are now being conducted by the U. S. Public Health Service.

Methanol or wood alcohol is a poison which may cause blindness and death if taken internally. According to some authorities it is equally poisonous if inhaled or absorbed through the skin. A cheap method of making it synthetically has made it practical for use as an anti-freeze. Public health authorities are now trying to determine how to eliminate the dangers from the wide use of so potent a poison.

Science News Letter, May 9, 1931

BOTANY

Nature Ramblings

By FRANK THONE

Solomon's Seal

TO SEE this graceful, bending, leafy-stemmed plant in the woods, with its two pendulous flowers at each joint under the leaves, one might wonder why it must bear the weight of the awful name that compelled the djinns to work the will of the Great King. But it is nothing more serious than certain markings in the stem, which can be connected with lines to form the double triangle or six-pointed star that is the traditional seal of Solomon, used even today by Jews on their synagogues as Christians use the cross on their churches.

An early botanist once tried to immortalize this popular fancy in Latin, calling the genus *Salomonia,* but it was shown that an even earlier botanist had called it *Polygonatum,* and the older name had to be given the right of way. The botanical name is not ill taken, however, because it refers to a pronounced characteristic of the plant—its zigzag stem. For *Polygonatum* is a combination of two Greek words that mean "many knees."

It was inevitable that a plant bearing such a magic mark should be used in medicine. Oddly enough, and unlike most such plants that were made into extracts or decoctions and poured into sick folks whether they liked it or not, Solomon's seal has a real medicinal value. It is a slightly astringent tonic, according to the official medicinal lists. However, there are many better tonics, and the use of Solomon's seal has fallen off considerably during the past few decades.

Science News Letter, May 9, 1931

More than 100 sportsmen from the United States go to Alaska each year to hunt bear, moose, caribou, mountain goats, and other animals.

MEDICINE

New Kind of Toxin May Yield Serum for Many Diseases

A NEW KIND of toxin which may mean great progress in the cure of infectious diseases has been reported by Dr. Gregory Shwartzman, of the laboratories of the Mount Sinai Hospital in New York City, to the Society of American Bacteriologists.

Since the discovery of the toxin or poison of diphtheria and the development of an efficient antitoxin serum for it, that disease has been effectively combatted, but similar methods when applied to other diseases have given effective results in only a few instances. The whole problem had come somewhat to a standstill and many leading investigators had lost faith in the future of such work.

Dr. Shwartzman's discovery of a totally new type of toxin formed by many bacteria opens the field again and puts the whole problem of the production and standardization of curative sera on an entirely new basis.

These toxins are found, Dr. Shwartzman reported, in the washings from the bodies of the bacteria and are capable of producing peculiar reactions when injected into the skin of experimental animals.

A few drops of the toxin are injected into the skin of a rabbit and after twenty-four hours a very small amount of the same toxin is injected into the blood stream of the animal. Four hours later a red area the size of a quarter appears at the place where the toxin was first injected.

The great hope for the work lies in the fact that the value of a curative serum is found to be gauged by its ability to prevent the development of this red spot.

By the use of the "Shwartzman Reation" it is hoped that a new serum treatment for typhoid fever, for dysentery, for meningitis, and for many other diseases may be found.

Science News Letter, May 9, 1931

BIOLOGY

Bacteria-Eating Protozoa Thrive Best on Mixed Diet

THE SMALLEST and most primitive of animals, the protozoa, like a balanced diet of mixed foods, no less than larger creatures that arrogate to themselves higher places on the evolutionary ladder.

At least, that is what has been learned by three Stanford University researchers, Prof. J. Murray Luck, Miss Grace Sheets and John O. Thomas, regarding one of the forms of minute animal life in stagnant water.

Protozoa, like the higher animals, have very diverse tastes. Some of them feed only on living microscopic plants —cows and sheep of the microscopic world. Others are carnivores, accepting only other protozoa as food. Still others are carrion feeders.

The organism selected by Prof. Luck and his associates was a plant-eater, feeding on bacteria, which are a low form of plant life.

In order to start "at scratch," the Stanford scientists cleared their protozoa of the bacteria already in them, by a prolonged and difficult washing technique. Then the organisms thus sterilized were offered various kinds of bacteria to eat. It was discovered that they throve little or not at all on several different species taken separately, but when two or three kinds of bacteria were made into a "mixed ration" the protozoa grew fat and multiplied.

It seems to be the living bacteria themselves that the protozoa want. In order to test a theory that they fed on some dissolved product of bacterial action, cultures of the protozoa were tried with broth in which bacteria had been grown and then removed by filtering or otherwise. But in these the protozoa failed to multiply, as they failed also in other kinds of food substances offered to them in solution.

Science News Letter, May 9, 1931

• First Glances at New Books

Philosophy

SCIENCE AND FIRST PRINCIPLES—F. S. C. Northrop—*Macmillan,* 299 p., $3. Moderns are much given to snorting at the philosophies of antiquity and the scholasticism of the middle ages, bragging that they "prefer to stick to facts." The thing such an attitude overlooks is that Aristotle and Aquinas were also sticking to facts, to the best facts they could get hold of, and that their whole striving was to stick these same facts together and make a working universe out of them. We have a vastly larger mass of much more definitely founded facts, and synthesizers so far have not been able to make a complete system of them. But that should not discourage efforts at synthesis; and books such as the present one are worthy of all praise as courageous endeavors at a task bigger than that faced by the thinkers of any earlier era.

Science News Letter, May 9, 1931

General Science

SCIENCE DISCOVERY BOOKS—H. A. Carpenter and G. C. Wood—*Allyn and* Bacon, Book I, 90c; Book II, $1; Book III, $1.20. These three books consist of thick blank notebooks which the student is to fill in for himself, largely from his own observations of his environment, guided by a few pertinent questions inserted at strategic points.

Science News Letter, May 9, 1931

Mathematics

COLLEGE ALGEBRA—W. L. Hart—*Heath,* 380+42 p., $2.12. A rich and flexible course in algebra for college students. The alternate edition has been rewritten without alteration of the main features and the exercises have been completely rewritten. Chapters on complex numbers, theory of equations, determinants, and the mathematics of investment are included.

Science News Letter, May 9, 1931

Entomology—History of Science

A HISTORY OF ENTOMOLOGY—E. O. Essig—*Macmillan,* 1029 p., $10. This book should properly be titled "A History of Economic Entomology in California." It is not a history of entomology in general, and its emphasis on California conditions and persons give it a very strict geographical limitation. However, within the smaller field as thus defined it is a very good book indeed, and deserves a place on the shelves of students, wherever they may be, who are interested in California entomology. An especially praiseworthy feature is a three-column tabulation, occupying 141 pages, of the principal events in entomology, with the birth-dates and death-dates of entomologists on either side.

Science News Letter, May 9, 1931

History of Science

TWO THOUSAND YEARS OF SCIENCE—R. J. Harvey-Gibson — *Macmillan,* 508 p., $3.50. To be strictly accurate, this book should be called "Five Hundred Years of Science," for all the obscure ancient and medieval roots of modern science are dismissed in about a score of pages. The author does not really get down to business until he begins his account of progress from the sixteenth century onward, and nearly half the total space is devoted to the section on Science of Today. With this limitation clear, the book can be recommended as readable and popular.

Science News Letter, May 9, 1931

Geography-Ethnology

AFRICA VIEW — Julian Huxley — *Harpers,* 478 p., $5. This book might with equal justice be called "Views on Africa"; for the noted author has opinions as well as observations as the result of his African travels, and does not hesitate to express them in the vigorous style characteristic of him.

Science News Letter, May 9, 1931

Genetics

GENETIC STUDIES OF GENIUS, VOL. III, THE PROMISE OF YOUTH—Barbara S. Burks, Dortha W. Jensen, Lewis M. Terman, and others—*Stanford University Press,* 508 p., $6. The thousand gifted children discussed in the famous first volume of this series are older by six years now, and are fulfilling their early promise by securing honors in high school and college although their IQ's have dropped somewhat. The report of the investigation is supplemented by case studies and selections of the literary work of juvenile authors.

Science News Letter, May 9, 1931

Physics

ESSENTIALS OF PHYSICS—Frederick E. Sears—*Laurel Book Company,* 596 p., $1.76. A well-organized textbook of physics for secondary schools, in its second edition.

Science News Letter, May 9, 1931

Anthropology

NEW DISCOVERIES RELATING TO THE ANTIQUITY OF MAN—Sir Arthur Keith —*Norton,* 512 p., $5. A noted English investigator in one of the most fascinating, and most disputed, fields of study sets down the principal facts regarding such discoveries as that of Taungs, Chou Kou Tien and the Gadarene cave, together with his interpretations of them. The presentation is largely technical, not intended for the non-scientific reader.

Science News Letter, May 9, 1931

Travel-Zoology

ADVENTURES IN THE AFRICAN JUNGLE—Carl and Mary L. Jobe Akeley —*Dodd, Mead,* 275 p., $3. A generation already becoming a little bored with "animal stuff" in the movies is apt to forget the debt it owes to the late Carle Akeley for his skill in organizing and his energy and will in leading expeditions into the great game country, bringing out whole groups of specimens, miles of camera film and solid additions to the lore of field zoology. This book, written in a style as vigorous as that of his sculptural compositions, will serve as a memento and a monument.

Science News Letter, May 9, 1931

Ecology

ENVIRONMENT AND PLANT DEVELOPMENT — Hennik Lundegardh, transl. by Eric Ashby—*Arnold,* 330 p., $9.50. Ecologists in Europe and America started pretty far apart and for some time it looked as though they would never really get together. But of recent years there has been an encouraging "spreading out" by workers on both sides of the water, so that now they speak a common language. Dr. Lundegardh's work is an excellent presentation of the viewpoint and methods of the physiological ecologist, and in rendering it into good, straightforward English Dr. Ashby has performed a distinct service to English-speaking workers in the plant sciences.

Science News Letter, May 9, 1931

Biography

EDWARD W. D. HOLWAY. A PIONEER OF THE CANADIAN ALPS—Howard Palmer—*Univ. of Minnesota,* 80 p., $1.50. An account of the mountaineering achievements of a man who was also a successful banker and a botanist.

Science News Letter, May 9, 1931